

the 21st a violent southwesterly storm passed over this city and vicinity, blowing down buildings, trees, signs, &c. This storm was accompanied by unusually heavy rainfall.

North Vernon, Jennings county, Indiana.—Between 7 and 8 p. m. of the 21st, a destructive storm visited this place, which caused considerable loss of property. It passed in a north-easterly direction through the western part of this county, destroying nearly everything in its path. Several residences and barns were destroyed and other property damaged.

Fort Smith, Arkansas.—At 11.30 a. m., of the 21st, a destructive storm swept over this station. The wind, for five minutes, blew at the rate of fifty miles per hour, and caused considerable damage in this vicinity. Several buildings were damaged, and many trees and much fencing were blown down.

Louisville, Kentucky.—A severe storm occurred here on the morning of the 21st. The wind reached a velocity of thirty-six miles per hour, blowing down a number of trees, chimneys, and signs.

Shreveport, Louisiana.—A very heavy rain-storm, lasting about two hours and accompanied by some hail, occurred here on the afternoon of the 21st. The streets were filled with water and many stores in the lower part of the city were submerged. During the storm it was almost as dark as night.

Natchitoches, Natchitoches parish, Louisiana.—A violent storm struck this parish near Cloutierville on the night of the 21st. A large amount of lint and seed cotton was lost and other damage caused.

Carmi, White county, Illinois.—A tornado visited the village of Sacramento, in this county, on the 22d, destroying several buildings. This is the second tornado that has occurred here within the last sixteen months, and about thirteen years ago the village was entirely destroyed.

Prairie du Chien, Crawford county, Wisconsin.—At 9 p. m. of the 25th, a tornado passed over this county in a direction from southwest to northeast. It first struck this county at Bridgeport, where several buildings were destroyed and one person was killed. Everything in the path of the tornado was destroyed; trees two feet in diameter were twisted off. The noise of the tornado was plainly heard at this place.

Portsmouth, North Carolina.—A violent northwesterly storm occurred here at 4.30 a. m. of the 27th, the wind reaching an estimated velocity of seventy miles per hour. Much damage was done to the coast telegraph line.

Kitty Hawk, North Carolina.—On the 29th the schooner "Annie Carll" was blown ashore on Nag's Head beach, eight miles south of this place.

NAVIGATION.

STAGE OF WATER IN RIVERS.

The water in the Mississippi river averaged considerably higher than for October. The changes in the upper Mississippi were very slight, but between New Orleans, Louisiana, and Cairo, Illinois, the highest points reached ranged from three feet and three inches, higher, at the former station, to sixteen feet and eight inches, higher, at the latter, where, on the 30th, when at its highest state, it was about twelve feet below the danger-line. At Saint Louis, Missouri, and Davenport, Iowa, the highest stages occurred on the 11th; at Keokuk, Iowa, from the 7th to 12th; at La Crosse, Wisconsin, on the 19th; at Saint Paul, Minnesota, Dubuque, Iowa, and at stations below Cairo, Illinois, the highest stages occurred at, or near, the close of the month. At Saint Paul, Minnesota, river observations were interrupted by ice from the 15th to 23d, and from the 28th to 30th.

The Ohio and Missouri rivers continued low during November, the former reaching a slightly higher point than during October; and the latter averaging slightly lower. At Yankton, Dakota, the Missouri river was frozen on the 15th and 16th.

Navigation in the Tennessee river, which had been suspended on account of low water since July 1st, was resumed

November 23d; the river having risen about four feet on that date. The highest stage occurred on the 25th, when it was ten feet and eleven inches above low water-mark, and four feet and ten inches higher than the highest point reached during October.

The greatest range in any of the rivers occurred in the Mississippi, between Vicksburg and Cairo, where it varied from twelve feet and three inches at the former station, to fourteen feet and nine inches at the latter.

In the following table are shown the danger points at various river stations; the highest and lowest stages for November, 1883, with the dates of occurrence; and the monthly ranges:

Heights of rivers above low-water mark, November, 1883.

Stations.	Danger-point on gauge.	Highest water.		Lowest water.		Monthly range.
		Date.	Height.	Date.	Height.	
<i>Red River:</i>	<i>Ft. In.</i>		<i>Ft. In.</i>		<i>Ft. In.</i>	<i>Ft. In.</i>
Shreveport, Louisiana.....	29 9					
<i>Arkansas:</i>						
Little Rock, Arkansas.....	30 0	24	10 6	22	4 11	5 7
Fort Smith, Arkansas.....	20	20	2 0	1	1 8	0 12
<i>Missouri:</i>						
Yankton, Dakota.....	20 0	17	3 7	29, 30	0 9	2 10
Omaha, Nebraska.....	16 0	1 10*	5 2	30	3 0	2 2
Leavenworth, Kansas.....	21 0	1	7 6	30	5 2	2 4
<i>Mississippi:</i>						
Saint Paul, Minnesota †.....	14 6	27	3 1	11	1 11	1 2
La Crosse, Wisconsin.....	18 0	19	4 4	30	1 0	3 4
Dubuque, Iowa.....	21 10	27	5 0	20	2 8	2 4
Davenport, Iowa.....	15 0	11	4 2	19	1 11	2 3
Keokuk, Iowa.....	14 6	7, 12	5 1	20, 21	2 8	2 3
Saint Louis, Missouri.....	30 0	11	14 6	6, 7, 21	10 1	4 5
Cairo, Illinois.....	40 0	30	28 2	1	13 5	14 9
Memphis, Tennessee.....	31 0	30	20 7	1	7 2	13 5
Vicksburg, Mississippi.....	41 0	23, 30	23 1	3, 4	10 10	12 3
New Orleans, Louisiana ‡.....	—2 0	27	—8 11	4	—13 0	4 1
<i>Ohio:</i>						
Pittsburg, Pennsylvania.....	20 0	1	8 1	21	3 10	5 1
Cincinnati, Ohio.....	50 0	23	20 8	9	11 11	8 9
Louisville, Kentucky.....	24 0	23	10 3	10	6 7	3 8
<i>Chamberland:</i>						
Nashville, Tennessee.....	42 0	28	16 8	8	4 7	12 1
<i>Tennessee:</i>						
Chattanooga, Tennessee.....	33 0	25	10 11	10	1 4	9 7
<i>Monongahela:</i>						
Pittsburg, Pennsylvania.....	29 0	1	8 1	21	3 0	5 1
<i>Savannah:</i>						
Augusta, Georgia.....		26	13 4	18, 19	4 5	8 11
<i>Willamette:</i>						
Portland, Oregon.....		28	8 8	10	0 10	7 10
<i>Sacramento:</i>						
Red Bluff, California.....		9	1 6	3	0 9	0 0
Sacramento, California.....		11	7 11	23	7 3	0 8
<i>Mobile:</i>						
Mobile, Alabama.....		21	16 9	16	12 8	4 1
<i>Colorado:</i>						
Yuma, Arizona.....						

* Frozen 15th and 16th. † Below high-water marks of 1874 and 1883. ‡ Observations interrupted by ice: see text.

CLOSING OF NAVIGATION.

Duluth, Minnesota.—Navigation for this season was practically closed on the 30th.

Moorhead, Minnesota.—Navigation in the Red river at this place was closed on the 15th.

Fort Totten, Dakota.—Navigation on Devil's lake closed on the 11th.

Dubuque, Iowa.—All boats at this place went into winter quarters on the 23d.

Saint Paul, Minnesota.—The last boat of the season left this place for Saint Louis, Missouri, on the 11th.

Fort Sully, Dakota.—Navigation in the Missouri river at this place was closed on the 26th.

Fort Benton Montana.—The Missouri river was closed to navigation here on the 25th.

Menand station (near Albany), New York.—The Erie canal was closed to navigation on the 30th.

The following data relating to the Hudson river at Albany, New York, are taken from "The Argus" of December 3, 1883:

The winter of 1873-4 was an exceptionally warm one, during which the river was closed but thirty-one days, and it is stated that navigation might have been kept up throughout the entire winter. The succeeding winter (1874-5) was a very severe one, the river being closed one hundred and twenty days, which is the longest period that it has remained closed at any time since the winter of 1823-4. The winter of 1835-6 was also one of great

cold, the Hudson river being locked in by ice for a period of one hundred and twenty-five days. Since 1790, the river was closed ten times during the month of November, as follows:

Year.	Date of closing.	Year.	Date of closing.
1796.....	November 28th	1835.....	November 30th
1797.....	" 26th	1838.....	" 25th
1798.....	" 23d	1842.....	" 29th
1820.....	" 13th	1871.....	" 30th
1827.....	" 25th	1880.....	" 25th

ICE IN RIVERS AND HARBORS.

Penobscot river.—Bangor, Maine: the river froze over at this place on the 29th.

Buffalo river.—Buffalo, New York: the first ice of the season in the river, at this place, appeared on the 16th.

Maumee river.—Toledo, Ohio: the river was covered with a thin film of ice on the 16th.

Grand river.—Grand Haven, Michigan: the first ice of this season in the Grand river formed on the 16th.

Lake Superior.—Marquette, Michigan: the schooner "Reuben Dowd" and all the tugs went into winter quarters on the 30th.

Duluth, Minnesota: Lake Superior was free from ice at this place on the 30th.

Saint Louis and Duluth bays.—Duluth, Minnesota: on the 16th Duluth bay was partly frozen over; boats experienced difficulty in forcing passage. On the 16th the ice on Saint Louis and Duluth bays was sufficiently strong to bear up the weight of persons. On the 17th the ice was reported to be six inches thick. Both the bays were frozen over on the 30th, and teams were crossing on the ice.

Mississippi river.—Dubuque, Iowa: thin ice formed along the shores on the 14th; floating ice on the 15th, 16th, 17th, 29th.

Saint Paul, Minnesota: floating ice 14th, 26th; on the 15th the ice formed a dam in the river; on the 25th the ice-dam moved out, leaving the river clear; another ice-dam formed on the 28th.

Other stations on the Mississippi river report floating ice as follows: Burlington, Iowa, 15th, 16th; Keokuk, Iowa, 16th to 19th; La Crosse, Wisconsin, 14th, 15th; Davenport, Iowa, 14th to 18th; Muscatine, Iowa, 15th.

Milwaukee river.—Milwaukee, Wisconsin: the river froze over at this place on the 16th.

Missouri river.—Fort Sully, Dakota: navigation was interrupted by floating ice on the 14th; river froze over on the 26th.

Yankton, Dakota: the river was blocked with ice on the 17th.

Other stations report floating ice as follows: Fort Bennett, Dakota, 12th, 14th, 15th; Omaha, Nebraska, 14th, 27th; Leavenworth, Kansas, 17th, 18th, 19th.

At Fort Benton, Montana, the river froze over on the 25th.

Red river (of the north).—Saint Vincent, Minnesota: the river froze over at this place on the 11th.

FLOODS.

Saint Louis, Missouri.—A severe rain storm prevailed throughout the state on the 21st, causing great damage to all kinds of property. It was especially severe in the southeastern part of the state. At Fredericktown, Madison county, a creek that runs through the town rose so rapidly as to sweep away several houses. At Piedmont, Wayne county, all but two of the houses in the place were washed away, and several persons were drowned. All of the streams in that vicinity overflowed, causing much damage to crops and farming property. The creeks in Wayne and Reynolds counties were higher than ever before known. The heavy rain storm of this date also extended over the greater part of southern Illinois. The streams in the vicinity of Mount Vernon, Jefferson county, overflowed, greatly damaging the crops in the low-lands. Trains on the Louisville and Nashville Air Line roads were delayed on account of wash-outs. In the vicinity of Duquoin, Perry county, a large area

was overflowed, and many bridges were washed away. Eleven coal mines near Belleville, Saint Clair county, were flooded, throwing about one hundred men out of employment, and causing damage estimated at \$500,000.

Indianapolis, Indiana.—The heavy rains of the 21st and 22d caused great damage in the southern part of this state. In the lower part of Knox county, near the confluence of the Wabash and White rivers, much farming land was overflowed, and heavy losses were sustained by the farmers in that region. Many bridges in the central part of the state were washed away, causing serious interruption to railroad travel. In the southern part of the state a large number of sheep and cattle were drowned, and numerous houses washed away. At noon, of the 23d, the White river, at Indianapolis, was within two feet of the high-water mark of February, 1883. On this date the low grounds in Indianola, on the west side of the river, were covered with water. On the 24th the White river overflowed its banks, flooding residences, elevators, and factories opposite this city.

Vincennes, Knox county, Indiana.—On the morning of the 21st the large dam of the Spring Lake Ice Company, a short distance from this city, broke, sending a volume of water through the town. Many houses were flooded and much damage done.

Bedford, Lawrence county, Indiana, 23d.—The recent very heavy rains caused great damage in the northern part of this county, and also in Monroe county, lying northward. The greatest damage was done about twelve miles north of Bedford, where about one mile of the Louisville, New Albany and Chicago railroad track was washed from the road-bed, and about ten miles of the road were badly damaged. Very heavy losses in stock, ungathered corn, and other property, were sustained.

Terre Haute, Indiana, 23d.—Portions of this city were submerged by the recent heavy rains. Wash-outs occurred on nearly all the railroads centring here, causing suspension of travel. The most serious damage was that caused by the overflow of the Wabash river, and the consequent submerging of thousands of acres of corn land.

HIGH TIDES.

Eastport, Maine, 15th.—The highest tides observed for several years occurred on this date. The tides were also very high on the 16th.

Block Island, Rhode Island.—Very high tides were caused by the high easterly wind on the 26th. At 7 p. m. the tide ran into Harbor pond, two hundred feet from the mean high-tide mark.

Hatteras, North Carolina.—Very high tide in the sound on the 27th.

Sloop Point, North Carolina.—High tides 30th.

LOW TIDES.

Block Island, Rhode Island.—Low tides occurred here on the 12th, 13th, and 26th. On the 13th the tide was lower than has been observed since the establishment of the United States Coast Survey tide-gauge at this place.

Low tides were also reported from New Haven, Connecticut, and Narragansett Pier, Rhode Island, on the 12th, and at Cedar Keys, Florida, on the 17th.

VERIFICATIONS.

INDICATIONS.

The detailed comparison of the tri-daily indications for November, 1883, with the telegraphic reports for the succeeding twenty-four hours, shows the general average percentage of verifications to be 86.22 per cent. The percentages for the four elements are: weather, 88.31; direction of the wind, 81.54; temperature, 88.04; barometer, 86.92 per cent. By geographical districts they are: For New England, 81.17; middle Atlantic states, 89.96; south Atlantic states, 88.00; eastern Gulf,